

AMENDMENTS TO THE DRAWINGS

The attached sheet of drawings includes changes to Figure 4A. Figure 4A has been amended to show the wave propagating down the page toward the antenna system. Accordingly, the portion of the figures to the left in the original Figure 4A has been moved above the mobile body.

Entry of the attached amended sheet of drawings is respectfully requested.

Attachments: Replacement sheet

Annotated sheet showing changes

REMARKS

Claims 1-20 are present in this application. Claims 1, 15 and 20 are independent. Claim 20 has been added.

Drawing Objection

Fig. 4A has been objected to. It is noted that the arrow extending from the broadcast tower 11 is intended to generally show the direction of wave propagation since the mobile body 10 is moving. Fig. 4A has been revised to show the mobile body 10 in a position below the broadcast tower 11, as requested in the Office Action. Applicant requests that the objection be withdrawn.

Claim Rejection – 35 U.S.C. § 112, First Paragraph

Claims 1 and 8 have been rejected under 35 U.S.C. § 112, first paragraph, as failing to provide an enabling disclosure. Claims 1 and 8 have been amended based on comments in the Office Action. Applicant requests that the rejection be reconsidered and withdrawn based on the claims as amended.

Claim Rejection – 35 U.S.C. § 112, Second Paragraph

Claim 2 has been rejected under 35 U.S.C. § 112, second paragraph. Claim 2 has been amended based on comments in the Office Action. Applicant requests that the rejection be reconsidered and withdrawn.

Claim Rejection – 35 U.S.C. § 102(b); Kompfner

Claims 1-13 and 15-19 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 3,503,070 (Kompfner). Independent claims 1 and 15 have been amended. Applicant traverses the rejection based on the claims as amended.

Embodiments of claim 1 are directed to an antenna apparatus capable of being installed at a mobile body (e.g., antenna apparatus 1 in Fig. 1). The antenna apparatus includes a plurality of receiving antennas (e.g., receiving antennas 2a to 2z), an antenna switching means (e.g., antenna switches 3a to 3z) for switching each of the plurality of receiving antennas between a connected state and a disconnected state respectively, and a control means (e.g., information processing circuit 6) for controlling switching by the antenna switching means based on the direction in which, and the speed at which, the mobile body moves, said controlling including calculating a relative direction of the mobile body relative to the direction of propagation of at least one propagating wave of at least one received signal. Embodiments of claim 15 are similar to embodiments of claim 1.

The present invention is a solution to a problem that occurs in conventional broadcast systems based on a diversity technique in which Doppler shifting of propagating waves cause interference to occur between subchannels that are adjacent in frequency domain (para. 0028). The arrangement in embodiments of the present invention is such that determination can be made as to whether there is occurrence of Doppler shifting based on the direction in which, and the speed at which, the mobile body moves relative to the direction of propagation of propagation waves of received signals. Subsequently, control of switching a plurality of receiving antennas at

times when it is determined that Doppler shifting is occurring make it possible to maintain states in which receiving antennas actually used to receive signals are substantially stationary relative to sources of transmission of received signals (paragraph 0032).

Kompfner appears to disclose an antenna mounted on a vehicle that solves the problem of Doppler effect by moving an antenna at the same speed as the moving vehicle, thus giving the effect of a stationary antenna. The Office Action alleges that the arrangement of the track on which the antenna moves as being aligned with the direction of movement of the vehicle, constitutes the claimed switching based on the direction in which the mobile body moves (see col. 1, lines 52-53). Applicant submits that Kompfner does not teach controlling switching based on the direction in which the mobile body moves “relative to the direction of propagation of at least one propagating wave.”

Claims 1 and 15 indicate that it is the direction of the mobile body relative to the direction of propagation of at least one propagating wave that is determined by the control means. The “speed” recited in the claims is the absolute speed at which the mobile body moves.

Furthermore, according to the specification at page 17, the information processing circuit 6 calculates the direction in which the mobile body is moving relative to the direction of propagation of the propagating wave (paragraph 0078). Thus, the claims have been amended to clarify that the control means performs “controlling switching by the antenna switching means based on the direction in which, and the speed at which, the mobile body moves, said controlling including calculating a relative direction of the mobile body relative to the direction of propagation of at least one propagating wave of at least one received signal.”

Applicant submits that Komfner fails to teach or suggest at least the claimed control means/device calculating a relative direction of the mobile body relative to the direction of propagation of at least one propagating wave of at least one received signal. Accordingly, Applicant requests that the rejection be reconsidered and withdrawn.

Claim Rejection – 35 U.S.C. § 102(b); Gothard

Claims 1, 3-7, 15, 16, and 19 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Application Publication 2002/0036586 (Gothard). Independent claims 1 and 15 have been amended. Applicant traverses the rejection based on the claims as amended.

Embodiments of claim 1 are directed to an antenna apparatus capable of being installed at a mobile body (e.g., antenna apparatus 1 in Fig. 1). The antenna apparatus includes a plurality of receiving antennas (e.g., receiving antennas 2a to 2z), an antenna switching means (e.g., antenna switches 3a to 3z) for switching each of the plurality of receiving antennas between a connected state and a disconnected state respectively, and a control means (e.g., information processing circuit 6) for controlling switching by the antenna switching means based on the direction in which, and the speed at which, the mobile body moves, said controlling including calculating a relative direction of the mobile body relative to the direction of propagation of at least one propagating wave of at least one received signal. Embodiments of claim 15 are similar to embodiments of claim 1.

Gothard discloses a directive antenna for use on a mobile environment such as a train (paragraphs 0029, 0030). Gothard teaches adjustment of the directive antenna toward an antenna

tower as the angle changes. Thus, Gothard monitors the position of the antenna tower relative to the directive antenna, and changes the angle of the directive beam accordingly.

The Office Action alleges that the change in direction of the received signal is a function of the speed of the receiver relative to the transmitter. On the other hand, the present controller controls switching based on the speed of the mobile body. Gothard's directive antenna does not take into account the speed of the train. Also, Gothard does not appear to address the Doppler effect. In particular, although Gothard's antenna appears to take into account the direction of propagation of a propagation wave (i.e., the direction of the antenna tower), it does not appear to determine the direction of the train relative to the direction of propagation of the propagation wave.

According to the specification at page 17, the information processing circuit 6 calculates the direction in which the mobile body is moving relative to the direction of propagation of the propagating wave (paragraph 0078). Applicant submits that Gothard fails to teach or suggest at least the claimed control means/device calculating a relative direction of the mobile body relative to the direction of propagation of at least one propagating wave of at least one received signal. Accordingly, Applicant requests that the rejection be reconsidered and withdrawn.

Claim Rejection – 35 U.S.C. § 102(b); Dorier

Claims 1, 3-7, and 15-19 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 3,360,113 (Dorier). Independent claims 1 and 15 have been amended. Applicant traverses the rejection based on the claims as amended.

Embodiments of claim 1 are directed to an antenna apparatus capable of being installed at a mobile body (e.g., antenna apparatus 1 in Fig. 1). The antenna apparatus includes a plurality of receiving antennas (e.g., receiving antennas 2a to 2z), an antenna switching means (e.g., antenna switches 3a to 3z) for switching each of the plurality of receiving antennas between a connected state and a disconnected state respectively, and a control means (e.g., information processing circuit 6) for controlling switching by the antenna switching means based on the direction in which, and the speed at which, the mobile body moves, said controlling including calculating a relative direction of the mobile body relative to the direction of propagation of at least one propagating wave of at least one received signal. Embodiments of claim 15 are similar to embodiments of claim 1.

In the rejection based on Dorier, the Office Action appears to interpret the claim as stating “the relative speed between the mobile body and the source of the transmission.” The claims, on the other hand, are directed to switching based on the speed of the mobile body. Dorier is directed to an antenna system for a satellite and does not appear to teach determining the speed of the satellite.

The Office Action also states that the speed of the satellite is inherently determined because the faster the satellite moves, the quicker new antennas will have to be chosen. Also, similar to Gothard, Dorier appears to take into account a specific direction toward Earth, but does not appear to determine the direction of movement of the satellite relative to the direction of propagation of a wave. Dorier does not appear to solve a problem due to Doppler effect.

According to the specification at page 17, the information processing circuit 6 calculates the direction in which the mobile body is moving relative to the direction of propagation of the propagating wave (paragraph 0078). Applicant submits that Dorier fails to teach or suggest at least the claimed control means/device calculating a relative direction of the mobile body relative to the direction of propagation of at least one propagating wave of at least one received signal. Accordingly, Applicant requests that the rejection be reconsidered and withdrawn.

Claim Rejections – 35 U.S.C. § 103(a)

Claim 14 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Kompfner in view of JP 9-284251 (Kimura).

Claims 9-14, 17, and 18 have been under 35 U.S.C. § 103(a) as being unpatentable over Gothard in view of U.S. Application Publication 2005/0129154 (Olesen).

Claims 9-14, 17, and 18 have been under 35 U.S.C. § 103(a) as being unpatentable over Dorier in view of Olesen.

Claims 9-14, 17 and 18 depend from claims 1 and 15, respectively. Applicant submits that at least for the reasons above for claims 1 and 15, the dependent claims are patentable as well. Applicant requests that the rejections be reconsidered and withdrawn.

New Claim

Claim 20 has been added that is comparable to claim 1 and includes the feature that the control means includes a function of “controlling switching by the antenna switching means

based on the received speed of the mobile body and calculated relative direction." Applicant submits that none of the cited prior art references teach at least this feature.

Conclusion

In view of the above amendment, Applicant believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert W. Downs (Reg. No. 48,222) at the telephone number of (703) 205-8000, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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Attachments: Replacement Sheet of Drawings
Annotated Sheet of Drawings



FIG.4 A

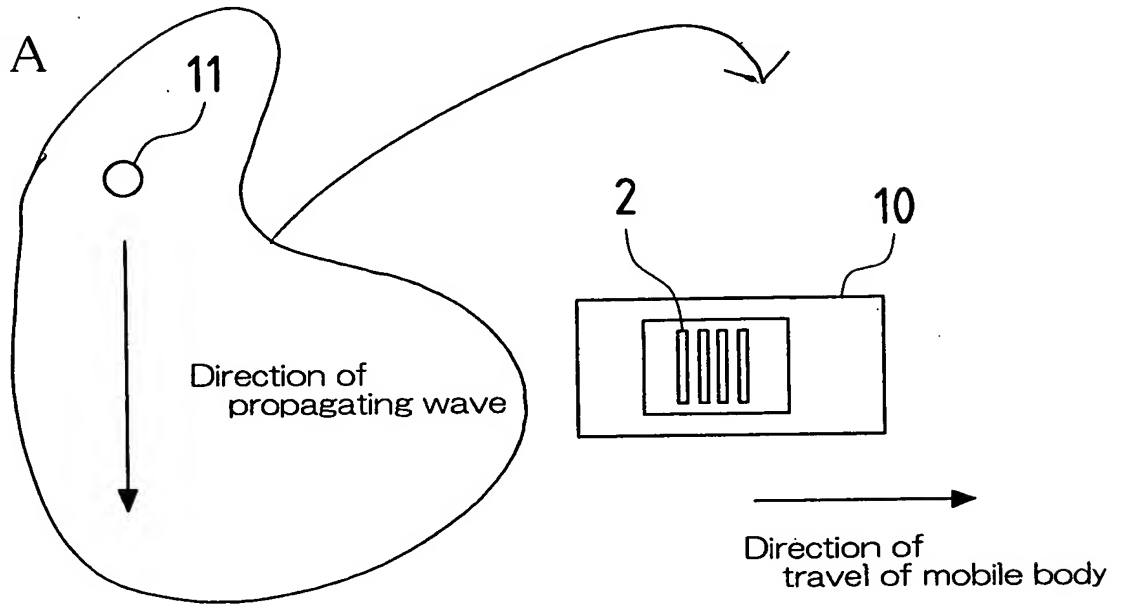


FIG.4 B

